



Laboratory

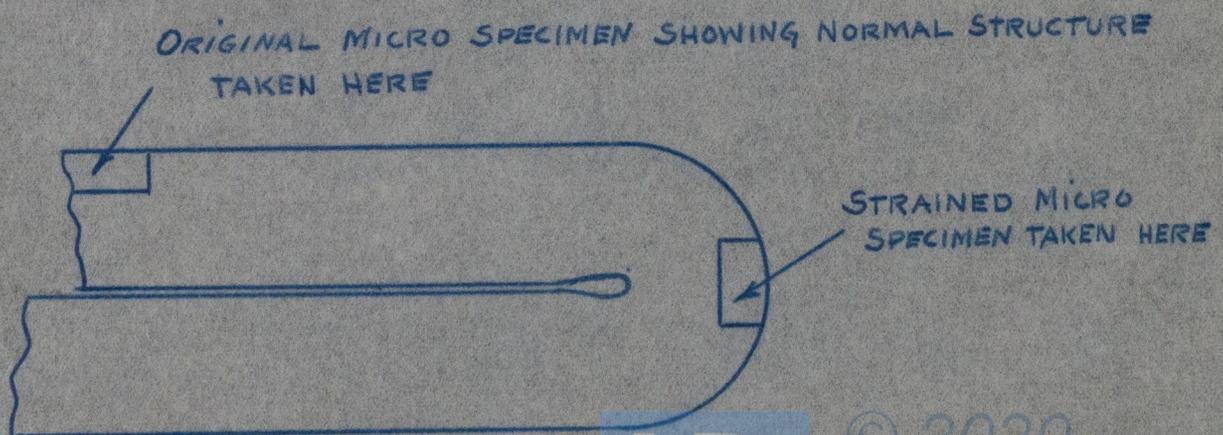
June 2, 1933

Mr. H. F. Norton, Naval Architect.

SUBJECT: Supplement to Report Entitled, Physical Characteristics of Plates Removed from the S.S. Charles Pratt, J.O. 1808-S, Dated May 23, 1933.
Lab. Test #376.

In order to more clearly show the difference between the normal crystalline structure of mild steel and the structure developed as a result of straining beyond its elastic limit we have made the following additional test.

The bend specimen representing Deck Stringer Frame 363 (which was bent 180° around a pin of diameter three times the plate thickness) was further bent until it was 180° flat on its self, as per the following sketch.



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W873-0180 1/3

2

The Photomicrograph below, taken at a magnification of 100X, shows the structure of the Deck Stringer Frame 363 after it had been strained beyond its elastic limit and can be compared to the Photomicrograph of the Deck Stringer Frame 363 in its unstrained condition as shown on page 11 of the report of May 23rd.



You will note that the white areas, or the ferrite, contain numerous small lines which are termed strain or slip lines caused by being subjected to distortion. The pearlite or dark areas do not show these slip lines for the ferrite is harder than the pearlite and hence less pliable.

Both the ferrite and the pearlite distort however under strain and you will note that in the above micrograph they have been elongated due to the severe bending and may be compared to the micrograph

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W373-9180 2/3

3

on page 11 of the report of May 23rd where they are both normal and do not lie in any particular direction.

The distorted structure of the pearlite as shown in Photomicrographs N-21-S and Longitudinal #19 on pages 10 and 11 of the original report is termed banded structure, cause of which is not definitely known but the consensus of opinion is that it caused by the elongation in rolling of a peculiar crystallization present in the original ingot. This condition should not be confused with the elongated structure of the above micrograph.

banded

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3